

Management Review of C-A Department's Environmental Management System and Self Assessment

Prepared by
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C-A Department
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Purpose

- Annually senior C-A management shall review its environmental performance, both qualitatively and quantitatively, for the purpose of identifying key improvement opportunities in the C-A environmental management system
- Managers shall conduct an annual review of organizational performance versus objectives and measures defined in their self-assessment program

Environmental Management Review Agenda

- Overview of programs that impact environment
- Audit results
- Review of FY 01 Record of Decision
- Stakeholder concerns
- EMS improvements
- Pollution prevention initiatives
- Environmental performance
- Environmental financial investments
- Evaluation by senior management

Self-Assessment Agenda

- Performance vs. objectives and measures
- External assessments
- Internal assessments
- Evaluation by senior management

Contract O&Ms Related to Self-Assessment and Environmental Management at C-AD

Measure

1.0 Excellence in Science & Technology 60%

- Objective 1.1 Research Quality
- Objective 1.2 Relevance to DOE Missions
- Objective 1.3 Construct & Operate Facilities

3.0 Laboratory Management and Operations 32%

- Objective 3.1 Management and Business Processes
 - Measure 3.1.1 Assessment and Improvement
- Objective 3.2 Environment, Safety and Health
 - Measure 3.2.1 Legacy ES&H Risk Management
 - Measure 3.2.2 Ongoing ES&H Risk Management
- Objective 3.5 Communications and Trust
 - Measure 3.5.2 Stakeholder Involvement and Understanding

Contract Supporting Assessment Measures (SAMS) Related to C-AD Activities



- **Laboratory Management and Operations**
 - Training and Qualifications
- **Environment, Safety, and Health**
 - Environmental Compliance
 - Maintain ISO 14001 Registration
 - Progress Toward Accelerator Authorization Basis Upgrades
 - Radiological Control
 - Regulated Waste Management
 - Safety and Health
 - Worker Involvement in Work Planning and Control

Ed Lessard

- Overview of C-A activities that impact environment
- EMS improvements
- Stakeholder concerns
- EMS status
- Questions answered:
 - What is the performance on the FY01 ROD?
 - What are the FY02 EMS objectives and targets?
 - What activities have significant aspects?
 - What are concerns of stakeholders?
 - What are the results of performance measures?

Overview: C-A Department Mission

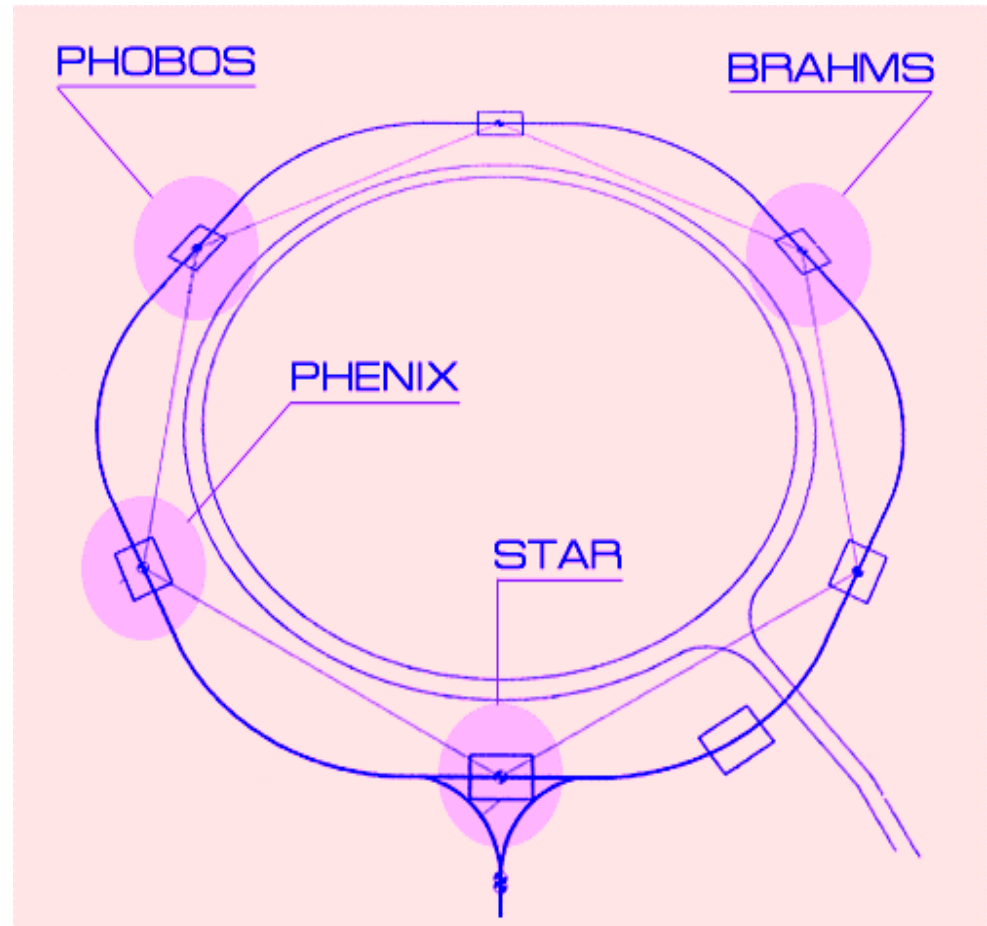
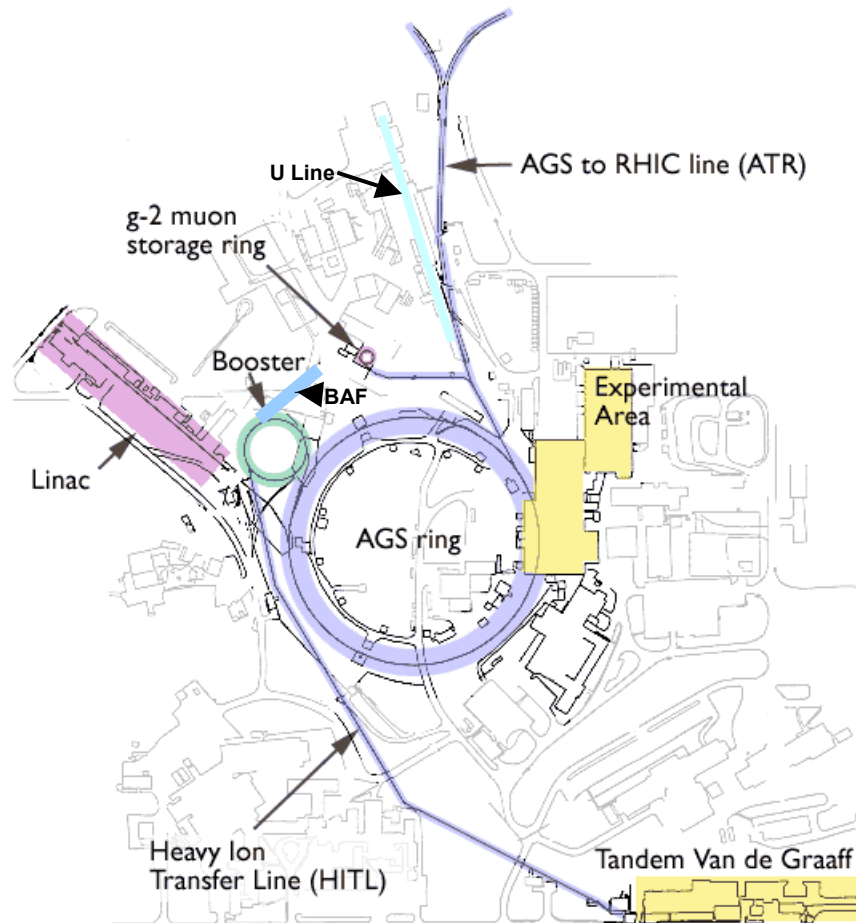
■ Mission

- Develop, improve and operate ion accelerators
- Support the experimental program
- Design and construct new accelerator facilities
- Excellence in environmental responsibility and safety

Overview: Significant Aspects at C-A

- Regulated industrial waste
- Hazardous waste
- Radioactive waste
- Mixed Waste
- Atmospheric discharges
- Liquid effluents
- Storage/use of chemicals or radioactive material
- Soil activation
- PCBs
- Environmental noise
- Water consumption > 650 K gals/day
- Power consumption > 58 M kW-h/year

Overview: C-A Department Facilities



Overview: FY02 C-A Department Demographics

Category	~Number of people (NP, HEP, SNS, BAF, experiments)
Scientific	52
Postdoctoral Fellows	3
Professionals	152
Technical	247
Administrative	28
Users	1598
Others (Students)	13
Total	2093

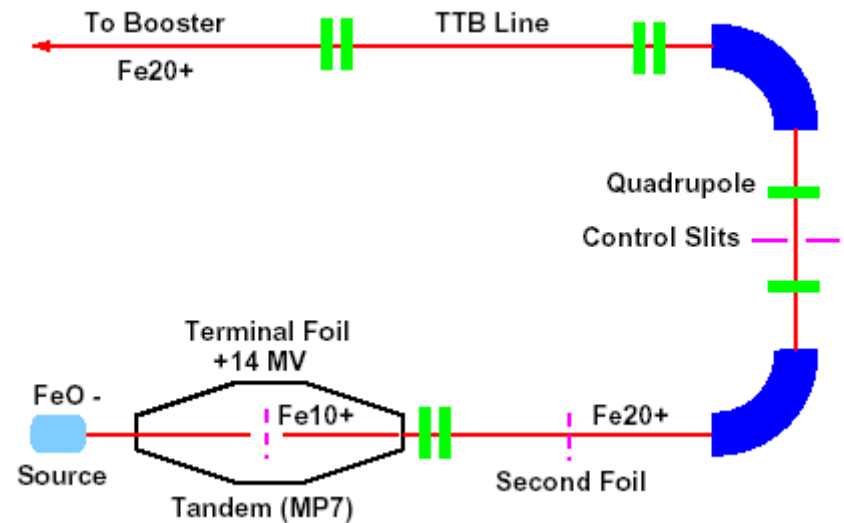
Overview: C-A Processes Re-Evaluated in FY02

- Beam line construction and disassembly
- Cooling water systems
- Electronic assembly operations
- Tech shop operations
- Mechanical assembly operations
- Metal cleaning operations
- Plating operations
- Cryogenic system maintenance
- Vacuum lab operations
- Beam stops and beam collimators
- Magnet cleaning operations
- BAF operations (new)

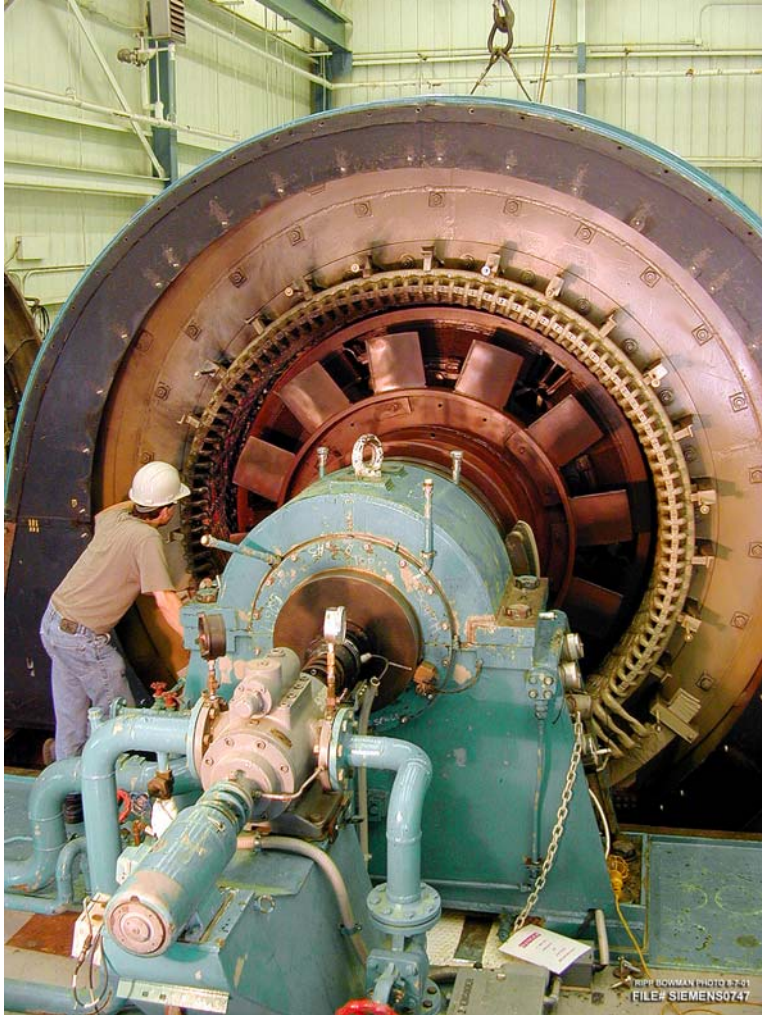
Overview: FY02 Non-Beam Operations



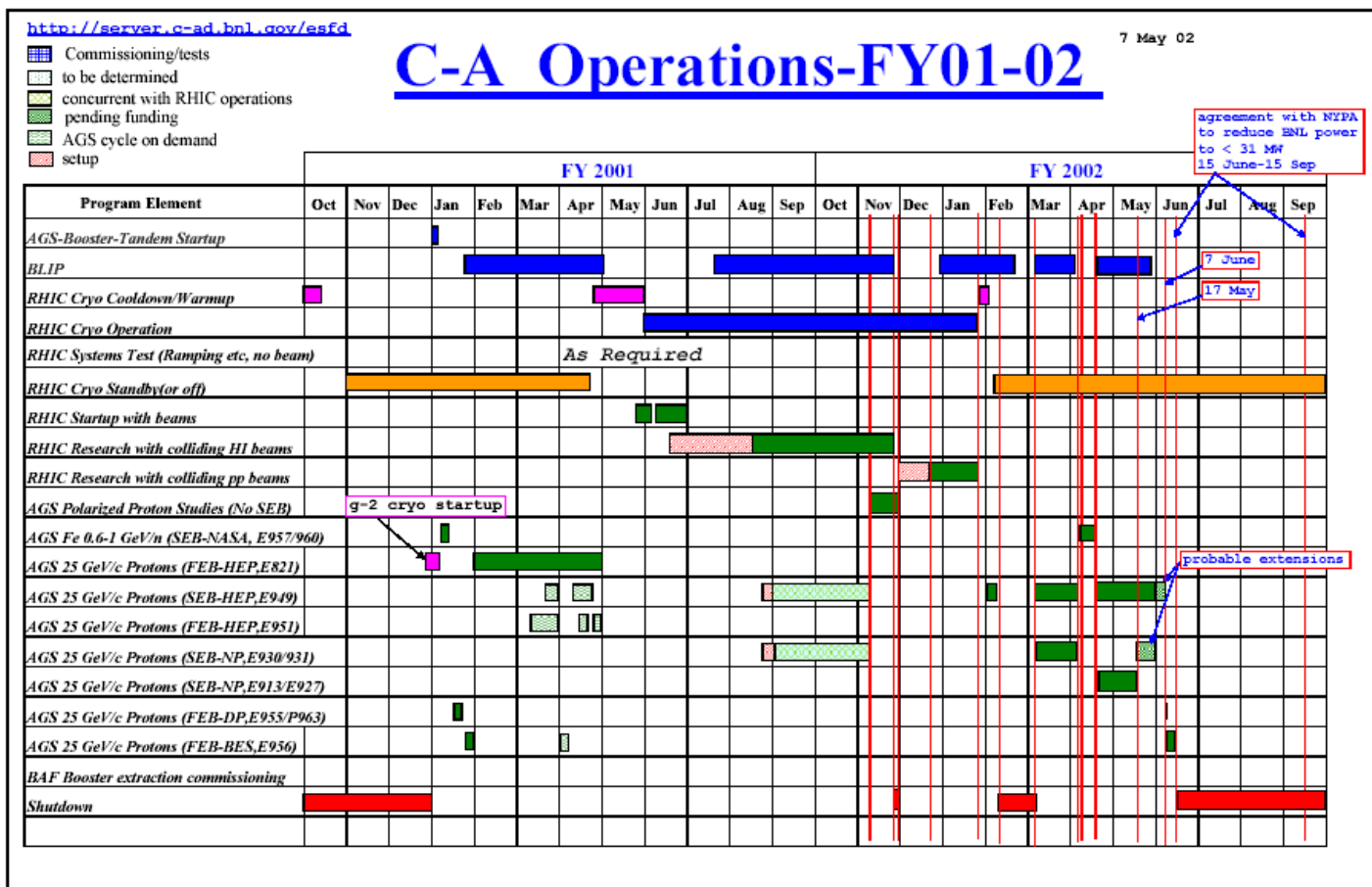
Overview: FY02 Non-Beam Operations






Overview: Non-Beam Operations



Overview: Beam Operations



EMS Improvements: Training, Documentation & Compliance Initiatives

- EMS re-training
 - Process specific: 99%
 - Environmental Protection for General Employee: 99%
 - Radioactive Waste Generator: 100%
 - Hazardous Waste Generator Training: 96%
- Authorization documents upgraded
 - BAF SAD, ASE
 - TVDG USI, ASE
 - C-AD SAD 30%
- Community Involvement OPM
- RHIC II NEPA and Cat X
- eCooler (B939) NEPA and Cat X
- Tank compliance with Article 12

EMS Improvements: Planned Facility Improvements, Funded, Tritium Related

- Disconnect AGS Fast Quad system from Ring
 - Add chillers at 13 locations
- Eliminate outdoor AGS magnet piping
- Add PLC and 2° containment to Collider injection
- Replace AGS F10 cooler with heat exchanger and tower
- More PLCs to g-2 water systems
- Secondary containment for outside pipes:
 - RF Cavity cooling
 - Reference Magnet Cooling
- Cap at H section of AGS Ring
- Cap at Linac beam stops
- Indoor 2° containment and storage for AGS tankers

EMS Improvements: Planned Facility Improvements, Not Funded

- Replace PCB capacitors at Linac
- Re-line cooling tower basins
- Continue to eliminate water treatment chemicals
- Replace oil switches with air switches at B912
- Alter storm water piping under fast extraction
- Continue to remove legacy waste from C-AD
- Restore water flow near AGS for fire protection
- Seal floors at 1005 to comply with Article 12
- Continue to upgrade fire protection

EMS Status: FY01 EMS Record of Decision

- Establish a realistic goal for solid waste reduction
- Set a more challenging goal for liquid waste reduction
- Fire safety deserves attention
- Deploy digital imaging at BAF
- Define and allocate resources to remove legacy materials
- Review EE/CA recommendations for g-2 plume

EMS Status: Progress on FY01 Record of Decision

- Improved waste goal:
 - Identify/implement cost effective waste management methods
- Improved liquid waste reduction
 - Improved by recycling Booster and AGS magnet water
 - NESHAPS obtained for year round evaporation
- Improved fire safety
 - B930 fire alarm panel replacement funded
 - Fire Hazards Analyses project for SAD upgrade
- Digital imaging to be employed at BAF
- Legacy items
 - Pb, steel and concrete partially removed
 - ADS submitted for legacy waste, \$1,000,000
- g-2 EE/CA extended due to complexity of data

EMS Status: C-AD EMS Objectives and Targets

- Objectives
 - Operate within regulatory requirements
 - Audits, except one, indicate no non-compliances
 - DOE Waste Management Audit
 - Integrate P2 in decision processes
 - P2 added to ESRC and ASSRC Reviews
- Targets
 - Prioritize and close EMP action items
 - 100% closed except FRDP which is on target
 - Evaluate pollution prevention opportunities
 - Pb bricks to Envirocare and cap Lessons Learned

SAM

Measure

EMS Status: ISO14001 Registration

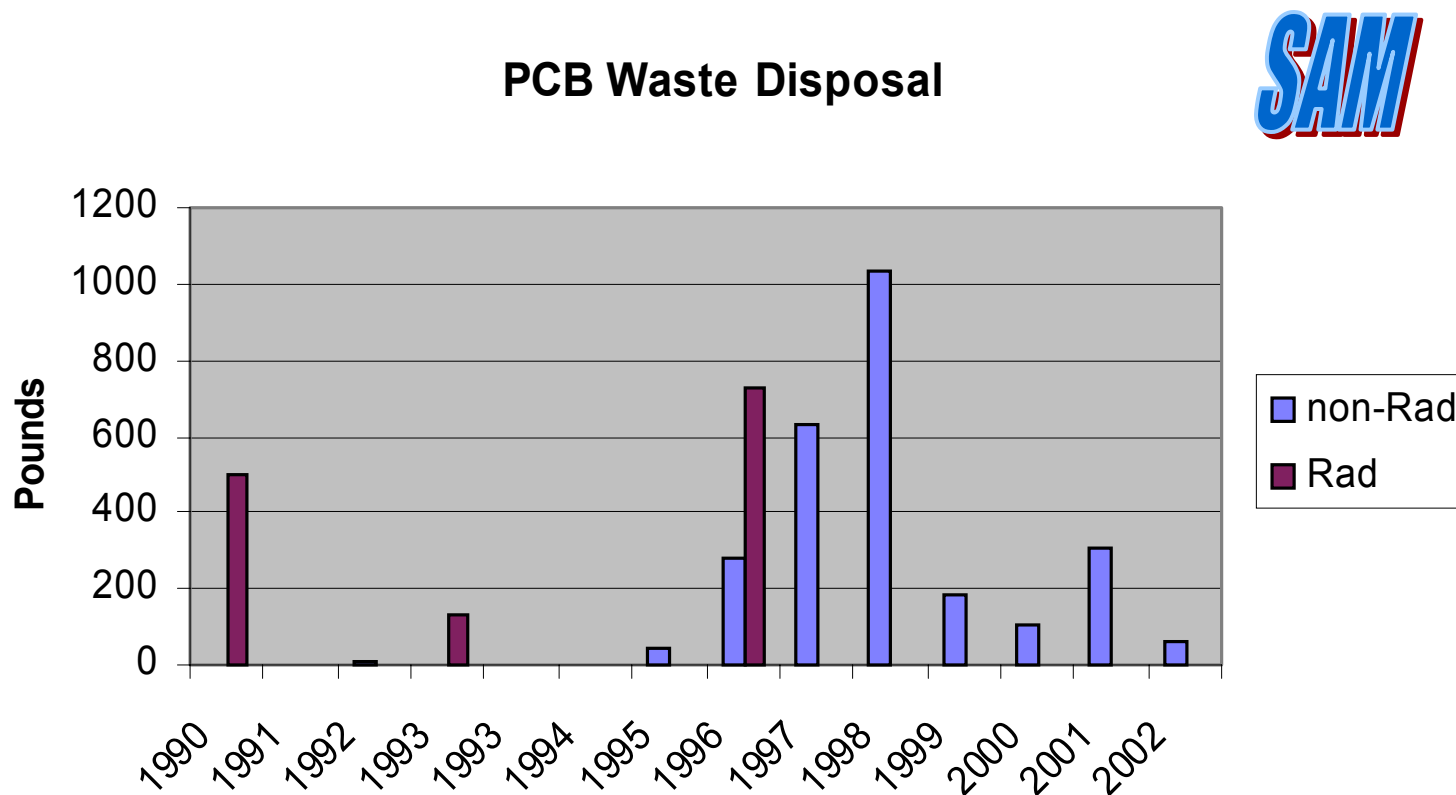
- All C-A Process Evaluations reviewed
- FY 02 EMS task list is 90% complete and on target
- All EMS documents updated
- All EMS documents controlled
- All EMS records identified
- ISO14001 registration maintained



Performance Measure: Significant Aspect Reductions

- Decreased hazardous waste
- Reduced Pb inventory
- Reduced tritium inventory
- Reduced water consumption
- Reduced chemical treatment
- Reduced soil activation
- Reduced PCB inventory

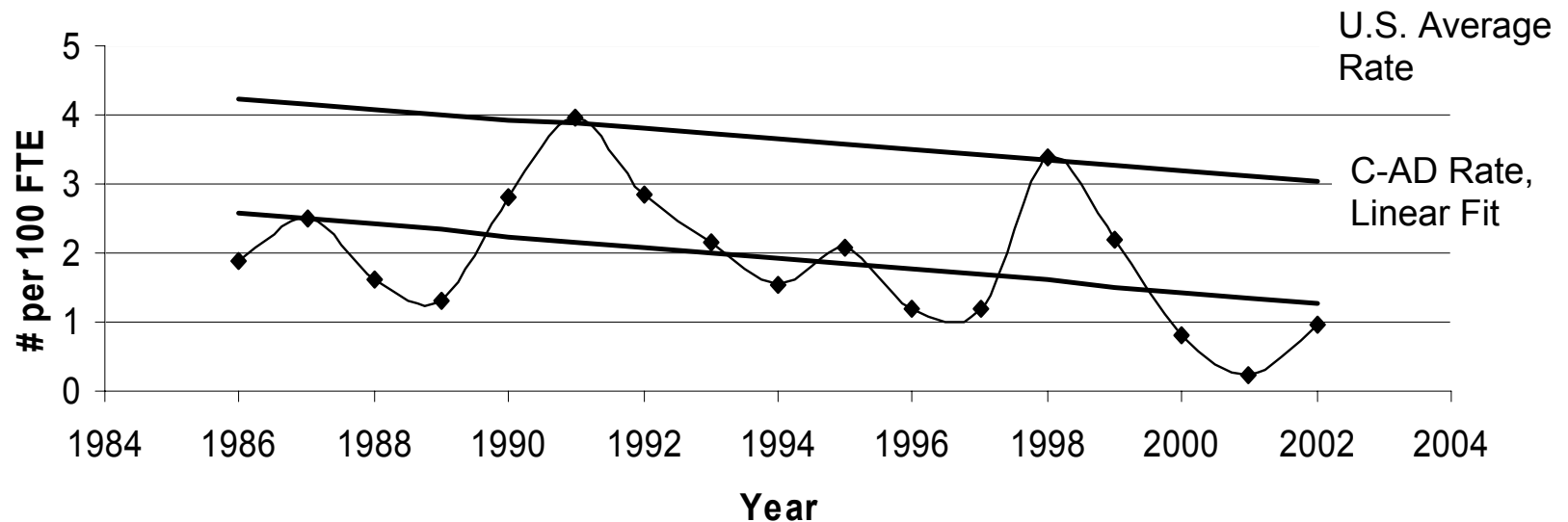
Performance Measure: Year to Year PCB Reduction



Performance Measure: Injury / Illness Trend

Measure

Lost Work Day Case Rate Compared to U.S. Average Rate



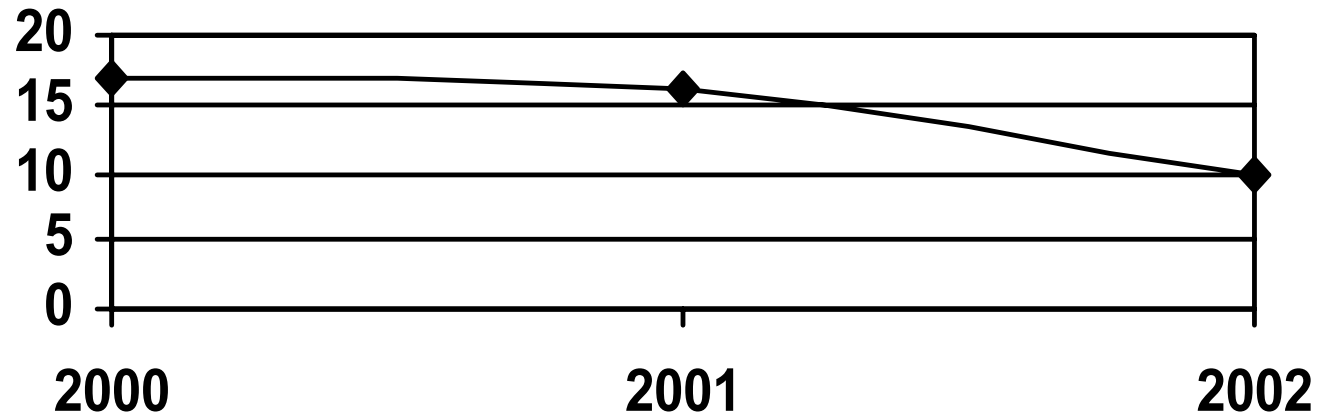
Decrease of 1 per 100 FTE (5 LWDC per year at C-AD) saves ~\$350,000/y

Performance Measure: C-AD Versus Private Industry, Incidence Rates, # per 100 FTE

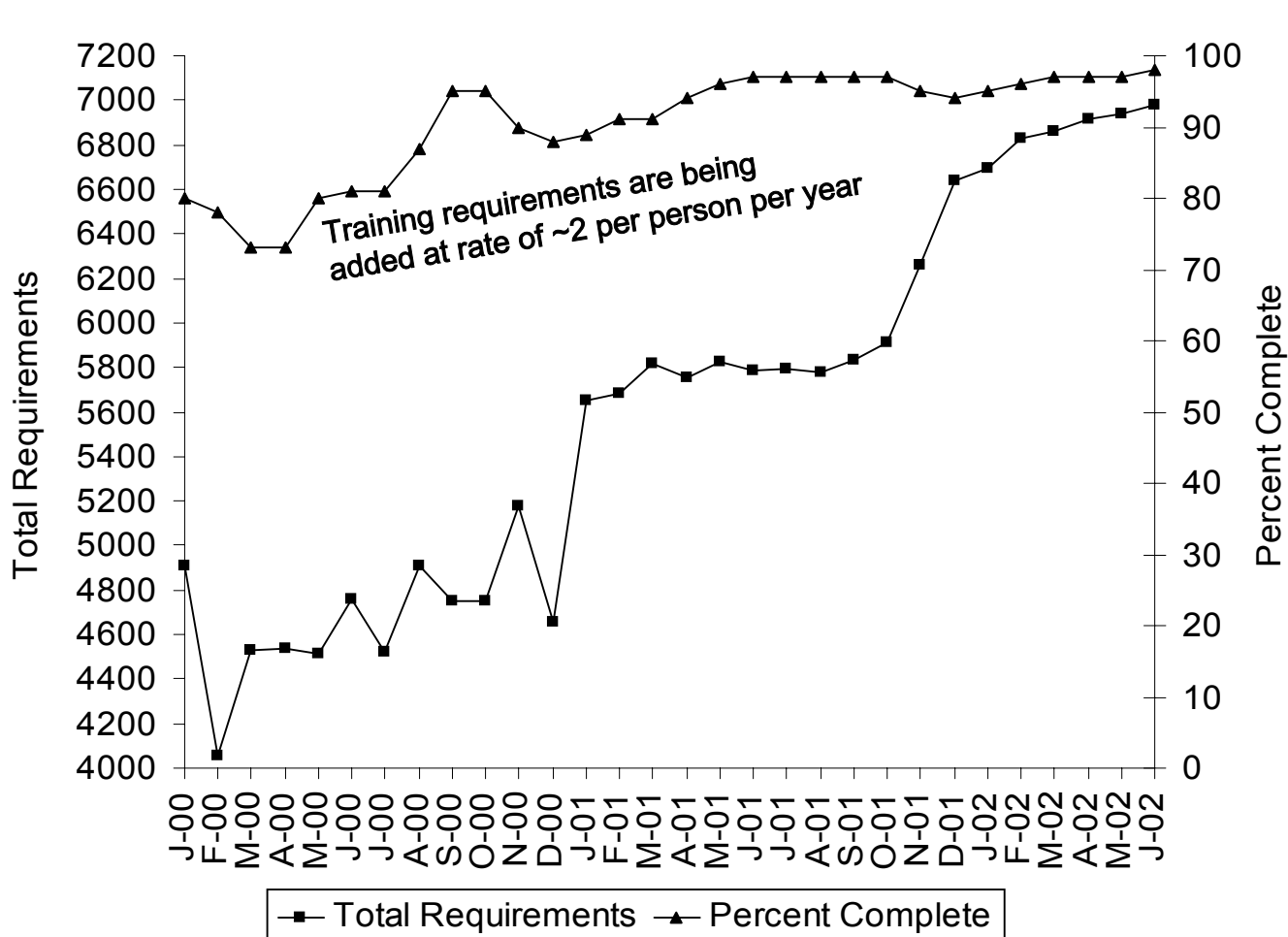
All Reportable Cases			Cases with Days Away from Work	
Year	Industry	C-AD	Industry	C-AD
1990	8.8	6.0	3.4	4.0
1991	8.4	5.4	3.2	2.9
1992	8.9	4.1	3.0	2.2
1993	8.5	4.9	2.9	1.5
1994	8.4	4.2	2.8	2.1
1995	8.1	2.4	2.5	1.2
1996	7.4	3.3	2.2	1.2
1997	7.1	4.8	2.1	3.4
1998	6.7	3.0	2.0	2.2
1999	6.3	1.2	1.9	0.80
2000	6.1	1.6	1.8	0.23

Performance Measure: Reports to BNL Clinic

First Aid Cases Excluding Athletic Injuries

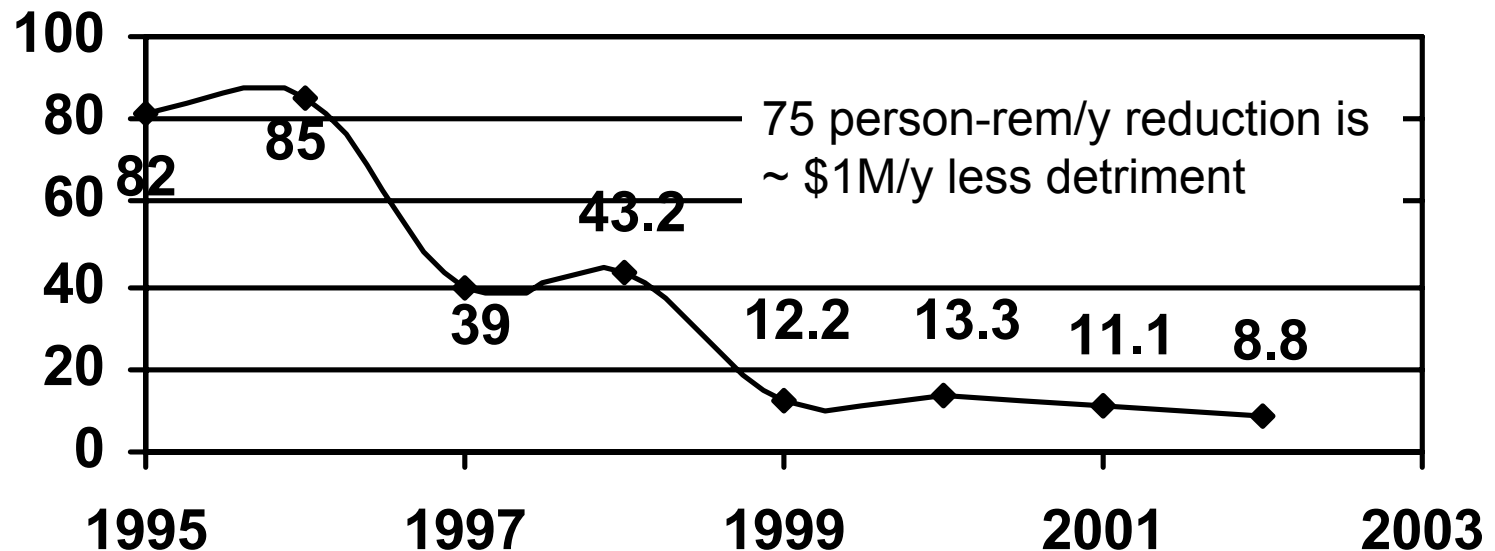


Performance Measure: Training Requirements and Completions



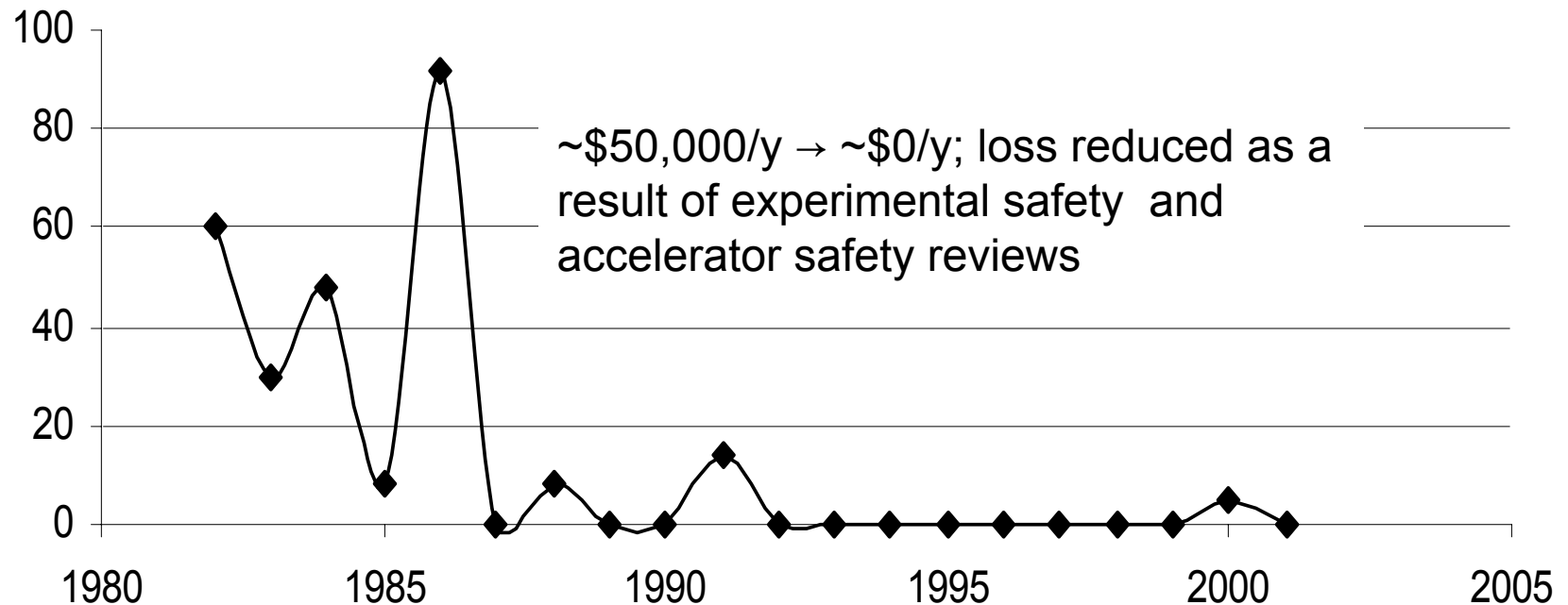
Performance Measure: Radiological Dose Reduction Trend

C-A Collective Dose Through 2002, person-rem



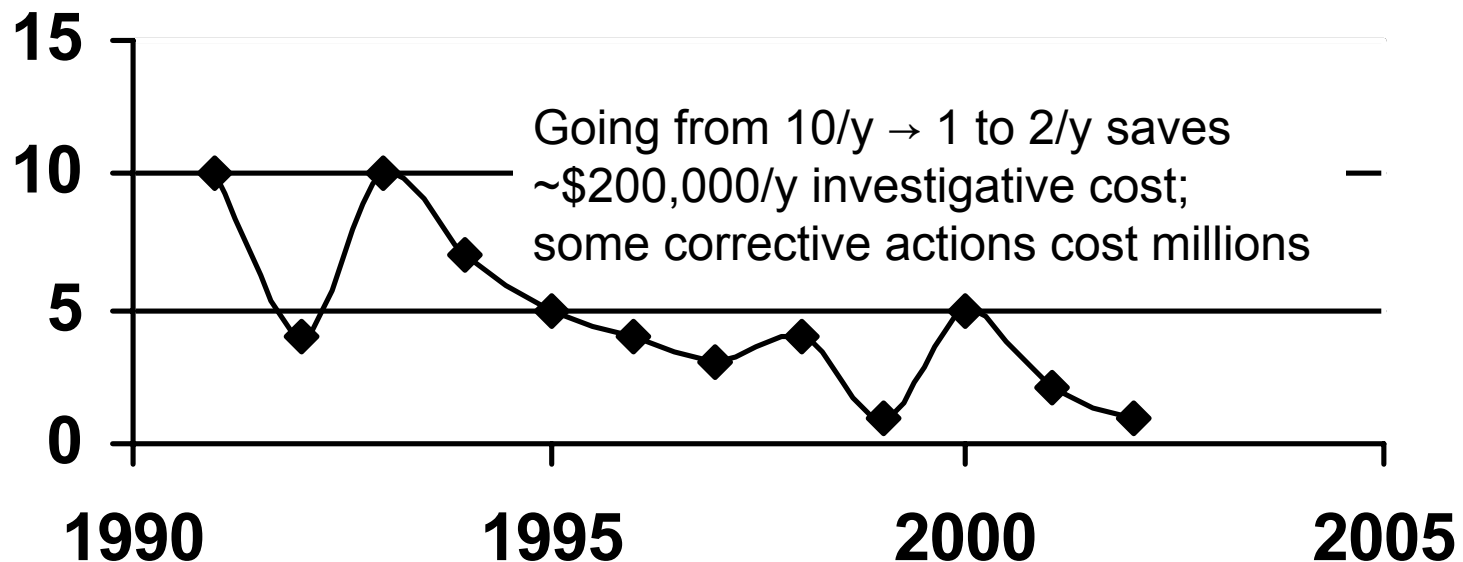
Performance Measure: Fire Loss Trend

Fire Loss at C-A Department, \$1000



Performance Measure: Occurrence Reduction

Unusual and Off Normal Occurrences



Stakeholder Concerns

- Community
 - g-2 tritium plume
- Regulators
 - g-2 tritium plume
- Activists
 - g-2 tritium plume

Dave Passarello

- Assessments
- Questions answered
 - What assessments were performed in FY02?
 - What were the external assessments?
 - What are results?
 - How were findings dispositioned?

A Reminder



Leaves of three
Let it be

FY02 Internal Assessment Programs

▪ Department Self-Assessment	1
▪ EMS Assessment	1
▪ Environmental Management Review	1
▪ Worker and supervisor self-assessments	19 (8)
▪ QA assessments	25 (8)
▪ Tier 1	32 (10)
▪ 90-Day Area inspection	52 scheduled
▪ Inspection of satellite-waste stations	12 schedule

FY02 External Assessment Programs

- DOE Independent 4
- BNL w/DOE Observing 3 (2 ESD, 1 S&H)
- NSF audit for ISO certification
- ARR for BAF
- ARR for Deuterons
- BORE – Building 958
- ERE – Building 197

Action Items From External Assessments

- DOE Independent Assessments
 - No Action items assigned directly to C-AD
 - C-AD participation crucial to closeout, e.g.
 - Rad Waste Authorization Document
 - Waste treatment or storage of waste

- BNL w/DOE Observing
 - 7 action items assigned
 - 4 closed

FY02 Self Assessment Plan

Provides a systematic approach to performance management

Ensure C-A's performance objectives are being met
and
improvement actions are identified and implemented.

FY02 Self Assessment Metrics

Critical Outcome 1 Excellence in Science & Technology

Objective 1.1: Success in producing original, creative scientific output.

Rating: Outstanding

1. Significant Accomplishments:	12
• RHIC is operational at full collision energy,	
• All experiments collecting data and publishing	
• Average luminosity equal to 33% of design	
• E949 received 5.7×10^{19} Protons	
• AGS and RHIC Context Switch	
2. Significant awards:	2
3. Peer-Reviewed Publications:	89
4. Proposals (>\$250K):	9
5. Technical Committees:	46

FY02 Self Assessment Metrics

Critical Outcome 1 Excellence in Science & Technology

Objective 1.3: Success in Constructing & Operating Research Facilities.

Rating: Outstanding

1. Budget & Schedule Performance:
 - All budgets were controlled & adhered to, cost plans were on target.
2. Facility Performance:
 - RHIC technical goals for FY 02 were either achieved or exceeded
 - AGS slow beam averages 6.4×10^{13} protons/pulse
 - World Record Peak at 7.4×10^{13}
3. Facility Availability
 - HEP = 87.7 %
 - NP (RHIC)= 82.5%
4. SNS: All critical milestones have been met

FY02 Self Assessment Metrics

Critical Outcome 1 Excellence in Science & Technology

Objective 1.4: Effectiveness & Efficiency of Research Program Management

Rating: Outstanding

- | | |
|--|----|
| 1. Management Goals and Processes: | 4 |
| • Continual improvement of Accelerator systems | |
| • Accelerator operations totally aligned with DOE mission | |
| 2. Significant Improvements in Infrastructure: | 5 |
| 3. Safety Enhancements: | 5 |
| 4. Steps toward development of next generation facilities: | 5 |
| • e.g. RHIC II, eRHIC, Neutrino Source | |
| 5. Projects/Programs Involving Collaborations with Others: | 12 |

FY02 Self Assessment Metrics

The following Measures and Supporting Assessment Measures (SAMs) have/will be addressed by other presenters

Measure

- 3.2.1 Legacy ES&H Management
- 3.2.2.1 Pollution Prevention
- 3.2.2.3 OSHA Reportable Injury Management
- 3.5.2 Stakeholder Involvement and Understanding

ES&H SAM

- Maintain ISO 14001 Registration
- Environmental Compliance
- Progress Toward Accelerator Authorization Basis Upgrades
- Radiological Control
- Regulated Waste Management

Management & Operations SAM

- Training and Qualifications

FY02 Self Assessment Metrics

Description and status of Measures and SAMs requiring internal C-A assessments

Measures

Measure

- 3.2.2.2 Transportation Safety Implementation (BNL Hazardous Material training & JTA's) Completed
- 3.2.2.4.1 Chemical Inventories and Accountabilities (1.8) Completed

ES&H SAM

- Worker Involvement in Work Planning & Control (2.28) In process
- Radiological Control
 - ALARA Program (9.5 series, 6.1.10) Completed
 - Radiological Control Instrumentation Calibration In-Process
- Regulated Waste Management
 - Handling/disposal of Hazardous waste (8.20 and 8.20.1) Completed

SAMs

Infrastructure, Facilities & Operations SAM

- Building Manager Program (2.31) Completed
- Energy Management (2.30) In process

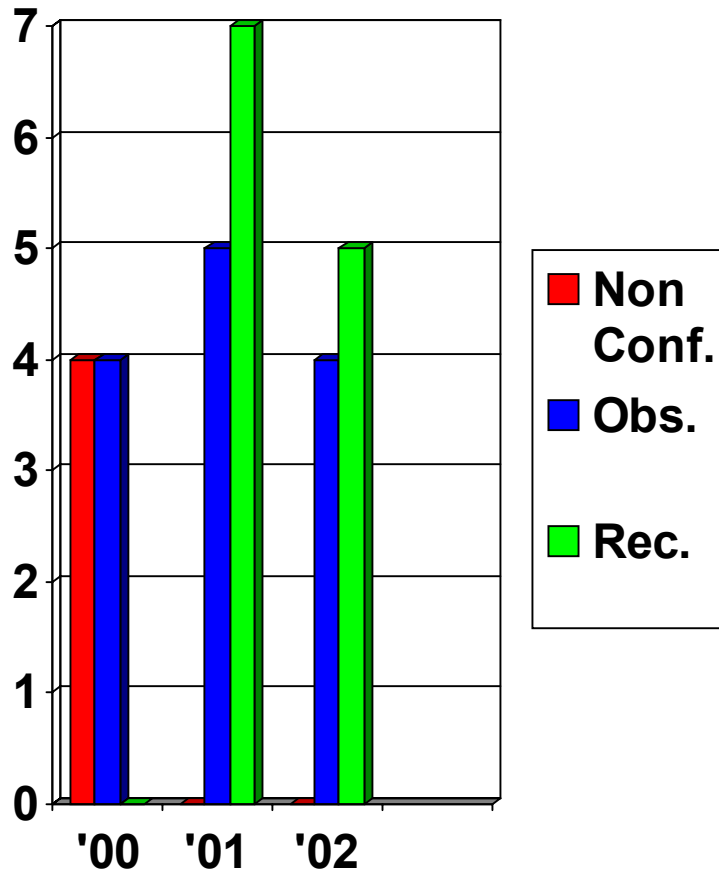
Closeout of Assessments

- Actions assigned to accountable individual(s)
- Internal action items in C-A ATS
- External action items in Institutional or C-A ATS
- Closeout requires concurrence of C-A Management

Mel Van Essendelft

- EMS Audits and Compliance Audits
- Pollution prevention initiatives
- Environmental performance
- Questions answered
 - What are the pollution prevention initiatives?
 - What is the effluent/emission performance ?
 - What is the performance on regulatory compliance?

Internal EMS Audit



'02 Minor Non-Conformances

- Transferring ATS responsibilities with change in personnel
- Contractor training linked to JTA
- Web link on EMS documentation
- Use of old forms

Internal EMS Assessment

- System strengths observed during audit:
 - Recycling components to minimize waste
 - Additional upgrades to C-A water systems
 - Management Review documentation and tracking
 - Communication of C-A EMS to employees

NSF ISO 14001 Audit

- No non-conformances, observations or recommendations at C-A from external EMS audit

Compliance Audits

- Air Emissions Assessment
 - 3 Findings
 - Emission Source Modification forms completed but not submitted to SME for review
 - Bead Blaster log book not being used
 - NYDEC air permit not conspicuously displayed
- PCB Assessment
 - 1 Finding
 - Large PCB Capacitors are labeled with small labels
 - 1 Observation
 - Possible use of old “blue” labels on PCB capacitors in an inaccessible area

C-A Pollution Prevention Initiatives

- Recycled magnets, shielding and other components
- Reuse of water from C-A tritiated water systems
- Started construction on rad-materials building
- Isolated domestic-water pipe under B912
- Added air-filter decay-in-storage practice
- Extended caps at RHIC 8 and 10 o'clock
- Planted trees and grass at RHIC

C-A Pollution Prevention Initiatives

- Added berm in front of AGS South Gate
- B930 fire alarm panel replacement
- Added earth shielding to TTB line
- 1005 H & R upgrades
- New cap at Booster dump
- Block Yard: 100 tons concrete removed
- Steel Yard: 100 tons steel staged
- Pb: 25 tons recycled and 25 tons removed



C-A Pollution Prevention Initiatives

- Upgraded water monitoring and control systems for:
 - AGS Chilled Water
 - BLIP Beam Stop
 - AGS F10 Cooler
 - RF Cavity
 - Linac Transport
- RF Power Amplifier: tritiated water isolation
- Removed direct cooling from AGS magnets
- Variable speed motor for TVDG cooling system
- AGS Main Magnet evaporative cooler control change



Pollution Prevention Designed Into BAF

- Soil capped
- Sump alarmed
- Drains to Sanitary
- Water make-up alarms
- No outdoor tritiated water piping
- Closed loop cooling system
- Back-flow preventers installed
- Airborne radioactivity re-circulated
- Groundwater monitored
- Target room ventilated

Environmental Performance

- SPDES discharge monitoring results
- Groundwater
- Air emissions
- Ambient radiation
- Spills

Results for Wastewater Discharge to Outfalls

Analyte		Outfall 002B (RHIC)	Outfall HN (RHIC)	Outfall HO (AGS)	Outfall HT-e (LINAC)	Outfall HT-w (AGS)	SPDES Limit	No. of exceedances
pH	Min.	6.7	6.2	6.7	6.7	6.4	-	0
	Max.	7.9	8.5	7.9	8.4	8.7	9	
Oil and Grease (mg/L)	Min.	<5	<5	<5	<5	<5	-	0
	Max.	<5	<5	9.9	5.2	6.6	500	
Hydroxyethylidene- diphosphonic Acid (mg/L)	Max.	.9	1.2	NA	1.0	1.0	.5	4*
*Positive detection of this constituent is suspect due to detection at a sampling station with no discharge of treatment chemicals and conflicting analytical results for duplicate samples sent to multiple analytical laboratories.								
Tolytriazole (mg/L)	Max.	<0.005	<0.005	NA	<0.005	<0.005	0.2	0

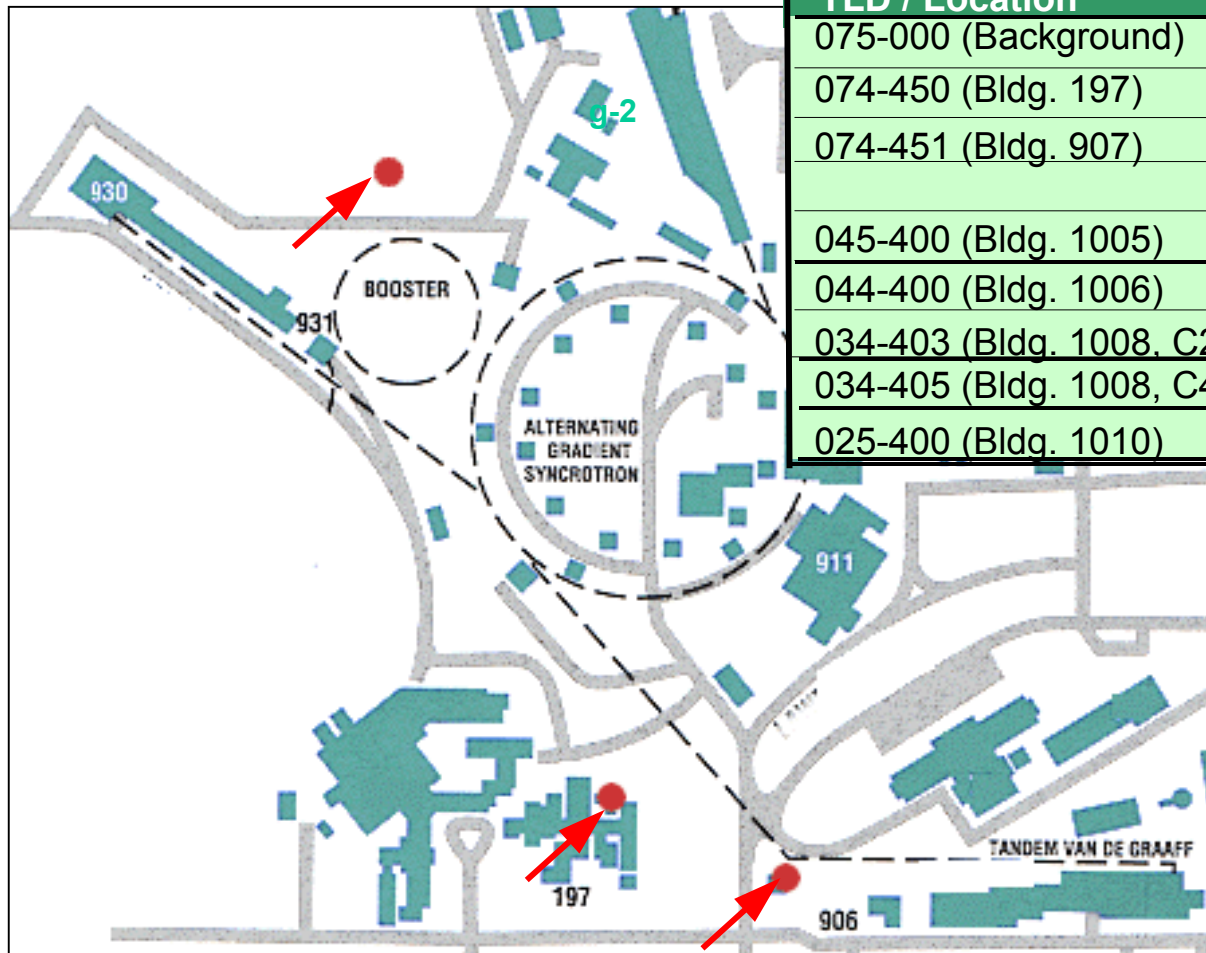
Water Quality Results for Recharge Basins

Location		Chlorides mg/L	Sulfates mg/L	Nitrate as N (b) mg/L
HN (RHIC Recharge)	Max.	154.2	18.3	<1
	Avg.	60.7	13	<1
HO (HFBR-AGS)	Max.	26.9	11.4	<1
	Avg.	23.5	10.1	<1
HT-e (AGS)	Max.	281	18.6	<1
	Avg.	89	12.4	<1
HT-w (LINAC)	Max.	117.9	11.3	<1
	Avg.	39.7	7.5	<1
NYSDEC Effluent Standard		500	500	10

Radiological Results for Recharge Basins

Basin		Gross Alpha (pCi/L)	Gross Beta (pCi/L)	Tritium (pCi/L)
HN	Max.	< 0.7	3.2 ± 1.4	< 374
	Avg.	-0.1 ± 0.2	1.2 ± 1.4	79 ± 89
HO	Max.	< 0.7	< 2.1	<374
	Avg.	-0.1 ± 0.3	-0.1 ± 1.1	29 ± 60
HT-e	Max.	-4.2 ± 2.3	2.7 ± 1.4	< 361
	Avg.	1.1 ± 1.8	0.9 ± 1.1	2 ± 44
HT-w	Max.	< 0.8	3.4 ± 1.4	< 374
	Avg.	0.4 ± 0.1	1.0 ± 1.7	39 ± 92
SDWA Limit		15	50	20,000

2001 Skyshine Results (mrem)



TLD / Location	QTR 1	QTR 2	QTR 3	QTR 4
075-000 (Background)	9.2	9.9	9.3	10.3
074-450 (Bldg. 197)	21.2	19.9	25.5	21.2
074-451 (Bldg. 907)	23.6	17.5	18.2	18.9
045-400 (Bldg. 1005)	27.1	24.4	18.8	20.7
044-400 (Bldg. 1006)	35.4	23.7	18.7	20.7
034-403 (Bldg. 1008, C2)	19.7	20.1	17.8	18.9
034-405 (Bldg. 1008, C4)	22.5	20	NR	22.9
025-400 (Bldg. 1010)	20.2	18.5	16.7	18.3

Results represent film badges in locations on a continuous basis.

Non-Reportable Spill Performance

CY2001 - # non-reportable spills

Date	Nature of Spill
6/8/01	1 gal of transformer oil (non-PCB) (Bldg. 930)
6/11/01	80 lbs. Of R-22 refrigerant (Bldg. 1005)
9/17/01	1 pint of oil/water mix (Bldg. 930)
10/20/01	~10 gal of heat transfer fluid (Bldg. 1005H)

Reportable Spill Performance

CY2001 - # reportable spills

Date	Nature of Spill
4/18/01	~120 gal of heat exchange fluid (Bldg. 1005H)
6/19/01	10 - 20 gal of transformer oil (Bldg. 930)
6/27/01	< 1 qt. motor oil (Bldg. 820)
8/11/01	~20 gal of heat exchange fluid (Bldg. 1005H)

CY2002 – To Date

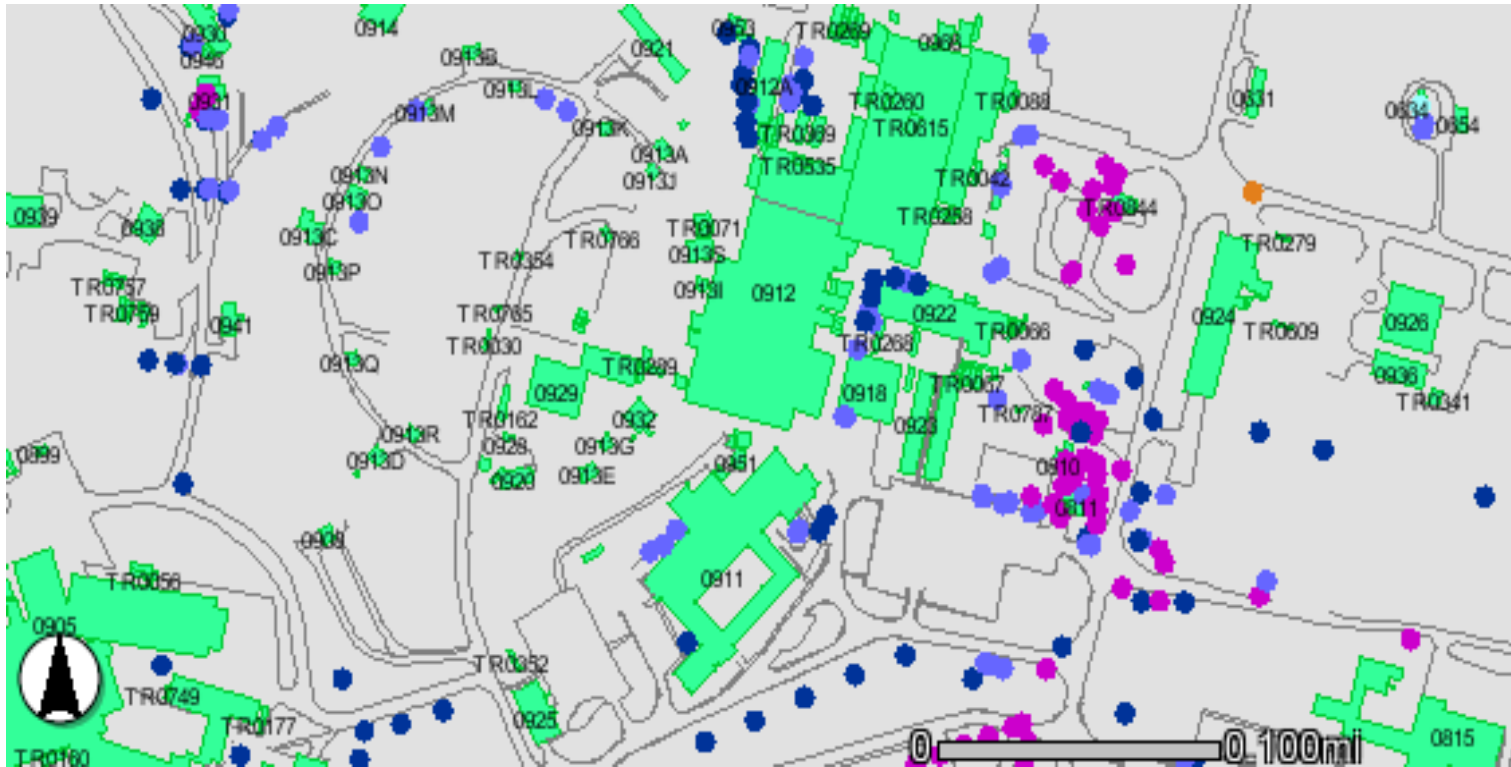
Date	Nature of Spill
5/30/02	.5 liters of hydraulic fluid (Bldg. 958)

Regulatory Compliance Performance

- 4 SPDES violations for HEDP at C-A recharge basins
 - Positive detection is suspect
- NESHAPS air, soil activation monitoring
- Programmatic Compliance Assessment Findings
 - Increased awareness of compliance requirements

Ray Karol

- Groundwater Issues
 - Activated soil shielding near beam targets and stops
 - Soil contaminated with tritium and sodium-22
 - Groundwater contaminated with tritium and sodium-22
 - 1970's discharges of solvents to cesspools & basins
 - Soil contaminated with volatile organic compounds
 - Groundwater contaminated with organic compounds



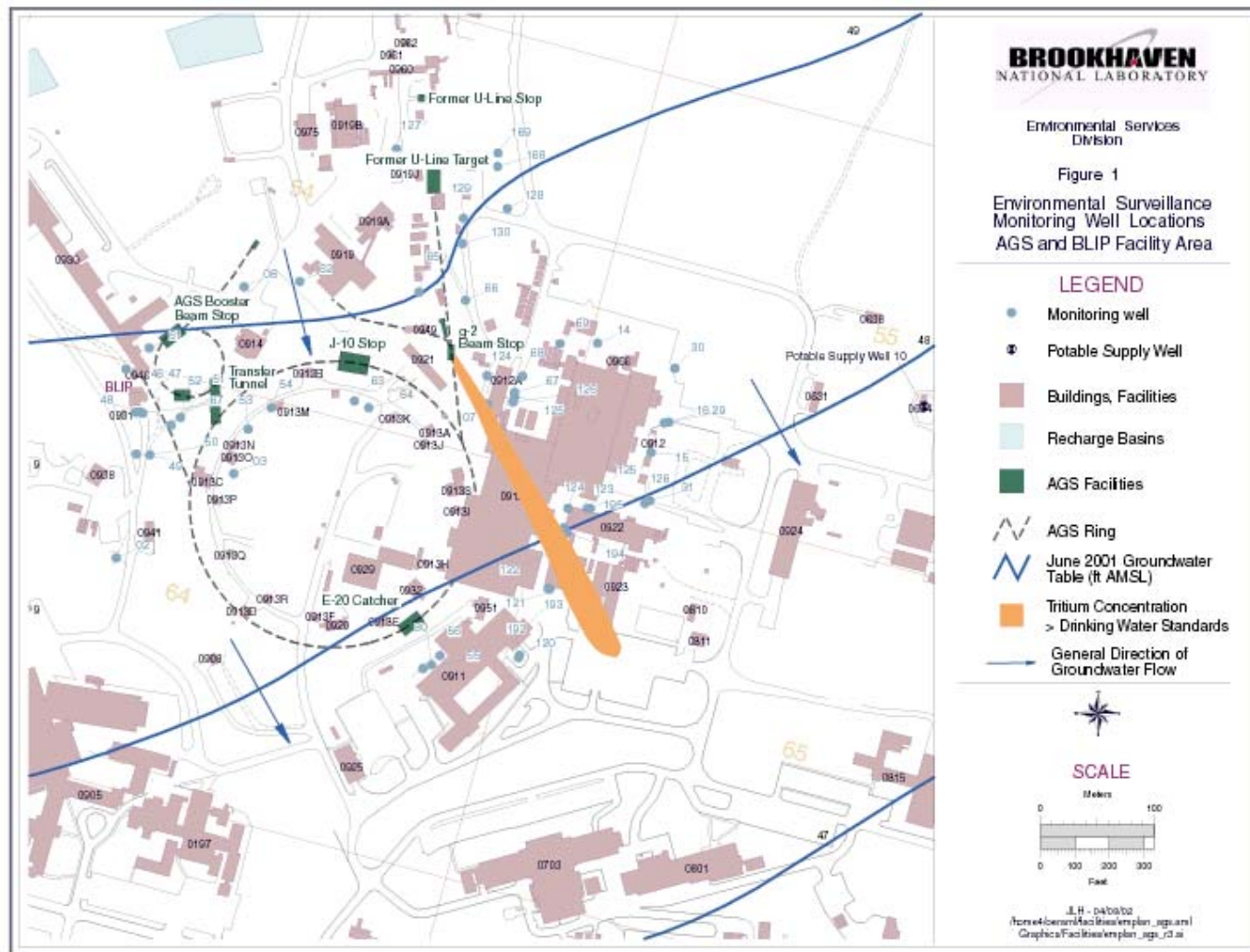
-  **Soil Boring**
-  **Monitoring Well**
-  **Temporary Well**

Cost of Groundwater Samples

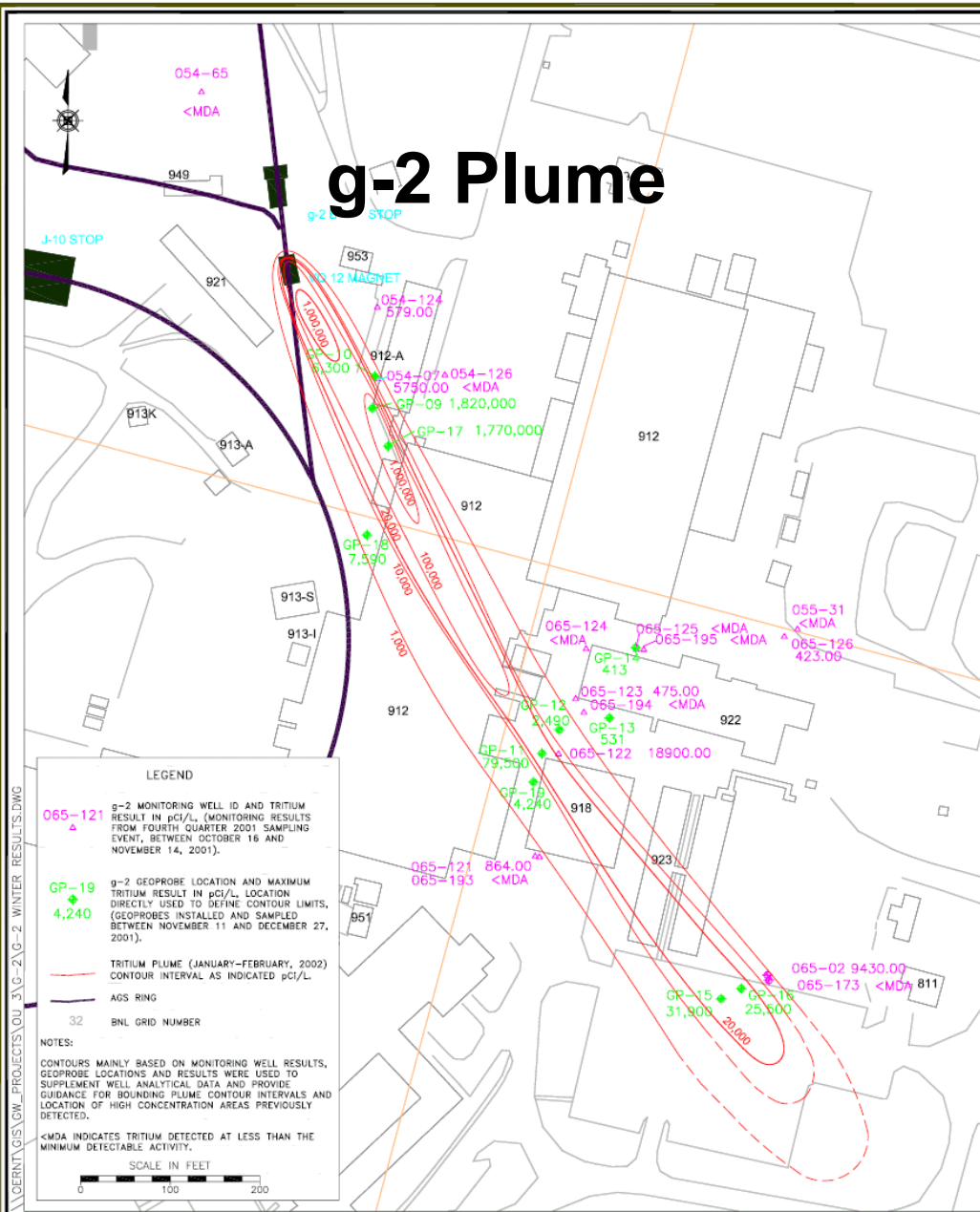
FY	AGS	RHIC	Total
2000	\$81,400	\$22,700	\$104,100
2001	\$68,100	\$13,500	\$81,600
2002	\$62,100	\$10,000	\$72,000

Tritium Groundwater Contamination 2001

Tritium Groundwater Contamination 2002



g-2 Plume



Brookhaven Science
U.S. Department of Energy

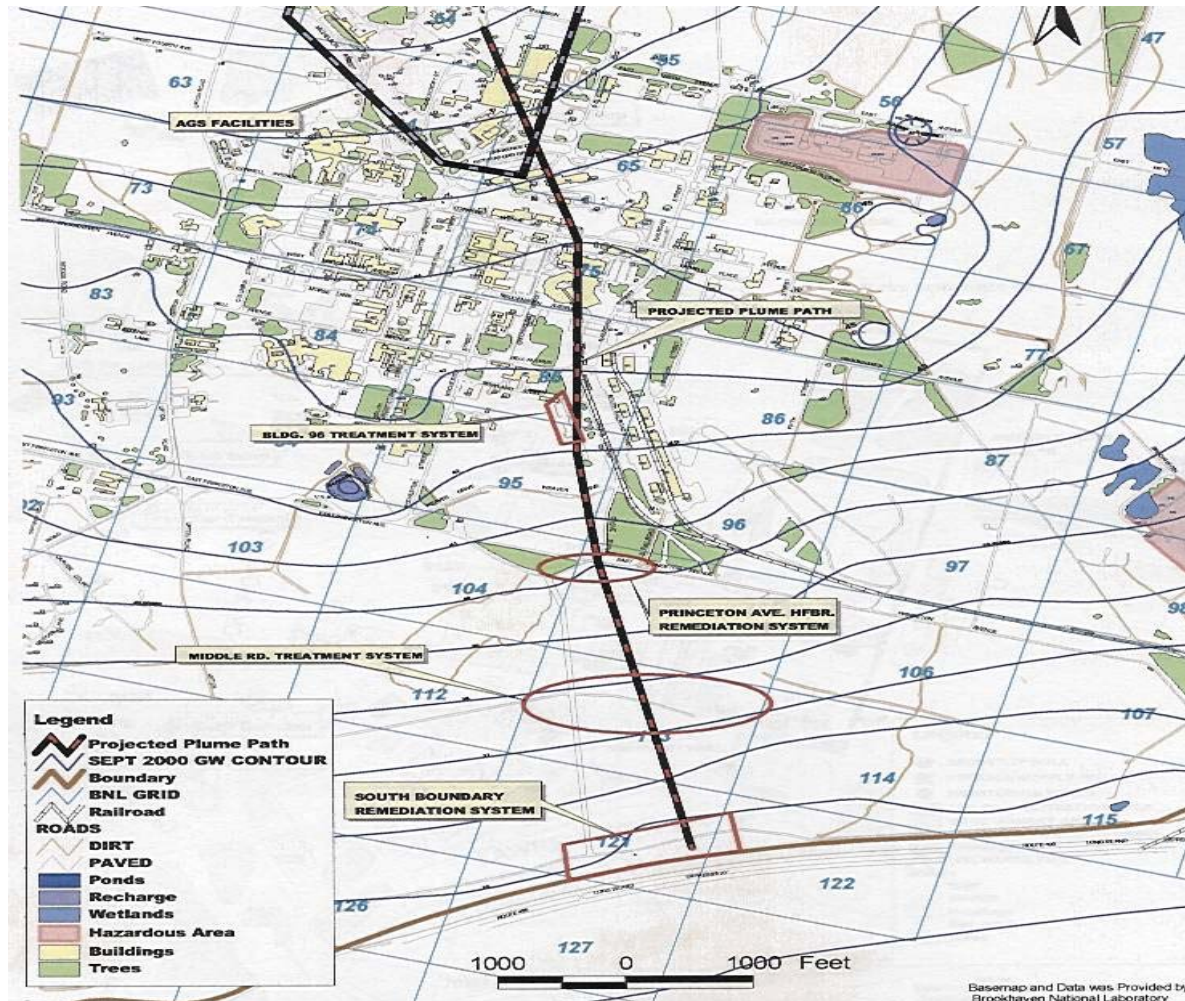
BROOKHAVEN
NATIONAL LABORATORY
ENVIRONMENTAL
SERVICES DIVISION

g-2 MONITORING WELL AND
GEOPROBE TRITIUM RESULTS
FOURTH QUARTER 2001

OWN: KCK	VT:HZ: -	DATE: 07/16/02	PROJECT NO.: 07176
CHKD: DEP	APPD: DBB	REV.: 1	NOTES: DRAFT
FIGURE NO.: 2			

BROOKHAVEN
NATIONAL LABORATORY

Projected Path of g-2 Tritium Plume



g-2 EE/CA Recommendations (2001 \$)

- No action
- 18-year monitoring, institutional controls (\$1.2 M)
- 6-year monitoring, recharge and re-circulate (\$0.94 M)
- 18-year monitoring, hot-spot contingency (\$1.5 M)
- 32-year monitoring, HFBR remediation system (\$1.6M)

EE/CA Extension Request

- Collect Additional Data – 7/1/02 to 10/31/02
- Revise EE/CA by 10/31/02
- Submit Revised EE/CA to EPA/DEC – 11/1/02
- EPA/DEC Review EE/CA – 11/2/01 to 12/2/02
- Issue EE/CA to Administrative Record – 1/13/03
- Public Comment Period – 1/13/03 to 2/15/03
- Prepare Action Memorandum – 1/14/03 to 1/1/03
- BNL/DOE Review Action Memo – 4/2/03 to 5/25/03
- Submit Action Memorandum to EPA/DEC – 6/1/03

C-A Water Tankers



Joel Scott

- Legacy issues
- Waste volumes
- Questions answered
 - What is status of the SMDP and FRDP?
 - What is status of waste reduction initiatives?
 - What is the plan for the new waste yard area?

Legacy Issues



Legacy Issues

- SREL aluminum coils (160k lbs.) \$205k low bid



Legacy Issues

- Lead (260k lbs.) \$507k low bid



Legacy Issues

- Out of service tankers (4) \$150k low bid



Legacy Issues

- Beam separators (64k lb) \$103k low bid
- 20k lb of internals sent off as waste
- Separators moved to an environmentally secure area



Sitewide Material Disposition Project Status

- 19 items identified, 780k lb
- 19 items characterized
- 2 items to waste last year
- 20k lb of beam separator internals
- Staging steel as soil fill, 220k lb
- 200k lb of concrete surveyed and sent as clean
- 2k lead bricks, 52k lb, sent for reuse at B1002
- 53k lb lead brick sent to Envirocare free of charges

Facility Review Disposition Project (FRDP)

- Develop path for disposition and closure for all items
- All 42 level 3 items are closed and completed
- About 75 levels 4-7 items still open
- ECR and EC working together to disposition and close

FRDP Status

- Closing out 5 to 10 Level 4-7 issues per week
- 75 issues remaining to be completed by Sept.

Waste Goals and Volumes To Date

Waste type	Total allotted	Total sent
Haz/Ind drums	28k lb	21k lb
Haz/Ind lab pack	1.2k lb	1.3k lb
Mixed	44 ft ³	37 ft ³
Radioactive Solid	3.4k ft ³	0.98k ft ³
Radioactive Liquid	1.8k gal	0.1k gal

- Note that totals sent to date are from first three quarters

FY02 Waste Reduction Initiatives

- Tankers heated to eliminate liquid waste – 10k gal/y
- Reusing 22k gal of Booster and Main magnet water
- Sending 3k gal of waste oil to steam plant for burning
- Previously mentioned FRDP items (lead, concrete, steel)

New Waste Yard

- Old building 960 area being demolished
- Existing waste yard is needed as recharge basin
- Moving waste area to old 960 area
- Some effort, electrical, carpentry, rigging required



“Before picture”

Cost Topics

- EMS Program Maintenance
- Pollution prevention
- Cleanups
- Fines/violation
- Monitoring
- ECR/EC/Waste Management Support
- Questions answered
 - What is the cost?

EMS Maintenance Cost

- EMS team task list (0.5 FTE)
- C-A staff-time during training (0.5 FTE)
- Environmental records (0.1 FTE)
- NSF audits (0.1 FTE)

Pollution Prevention Cost

- Tritiated cooling-water systems upgrades (\$300,000)
- Linac/Booster fire alarm panel (\$100,000)
- Radioactive Materials Storage Building (\$3,000,000)
- Extended caps at RHIC (\$147,000)
- Trees and grass at RHIC (\$50,000)
- TTB shield upgrade (\$10,000)
- Berm in front of South Gate (\$80,000)

- Total \$3,687,000

Clean-Up Cost FY02 To Date

▪ g-2 wells, geoprobes and sample costs	\$102,000
▪ Hazardous/Industrial Waste	\$149,000
▪ Mixed Waste	\$41,000
▪ Radioactive Solid Waste	\$691,000
▪ Radioactive Liquid Waste	\$69,000
▪ Total Waste	\$950,000
▪ Total clean-up costs including g-2	\$1,052,000
▪ Proposed C-AD FY03 Waste Cost	\$3,700,000

“Beyond Quota” FY02 Charge-back rates applied to quota

Waste Output Comparison to FermiLab

C-A DEPARTMENT ROUTINE WASTE				
Solid Low-Level Waste Shipped	1999	2000	2001	3-Yr Mean
Radioactive Waste (cu-ft)	624	1642	2719	1661.7
Hazardous Waste (cu-ft)	16.1	91.4	32.4	46.6
Mixed Waste (cu-ft)	18.75	40.3	21.6	26.9
Industrial Waste (cu-ft)	179.4	220.4	445.5	281.8
FERMILAB BEAMS DIVISION ROUTINE WASTE				
Solid Low-Level Waste Shipped	1999	2000	2001	3-Yr Mean
Radioactive Waste (cu-ft)	1523	4119	1189	2277.0
Hazardous Waste (cu-ft)	25.1	14.1	10.61	16.6
Mixed Waste (cu-ft)	-	-	-	-
Industrial Waste (cu-ft)	181.8	360	800	447.3

Waste Cost Comparison to FermiLab

RHIC Operations Including STAR, PHENIX, BRAHMS, PHOBOS Non-Research	2001
Staffing (FTE)	420
Total Operating Cost (\$M)	96
3 Year Average Radioactive Waste (ft ³)	1500
Total BNL Waste Cost (\$M)	5.9

Tevatron Operations Including CDF And DZero Non-Research	2001
Staffing (FTE)	690
Total Operating Cost (\$M)	147.5
3 Year Average Radioactive Waste (ft ³)	2300
Total FermiLab Waste Cost (\$M)	2.1

Fines/Violations

- None

Monitoring Cost

- FY02 sampling and analysis cost is \$72,000
- Inspection and maintenance of C-A caps \$10,000 y⁻¹

‘E’ Related Support Cost

- Environmental Coordinator (1 FTE)
- Environmental Compliance Representative (1 FTE)
- Hazardous Waste Technician (1 FTE)

EMS Cost Summary

■ EMS maintenance -	1.2 FTE
■ Pollution prevention -	\$3,687,000
■ Clean-up -	\$1,052,000
■ Fines -	\$0
■ Monitoring -	\$82,000
■ Technical support –	3 FTE
■ Total -	\$5.2M

FY02 C-A EMS and SA Summary

- EMS is mature and part of C-AD culture
- SA ensures C-A's performance objectives are being met
- Both help ensure improvement actions are identified and implemented

Senior Management EMS Program Evaluation

- Purpose: identify improvement actions and assign responsibility and resources to implement

Management Question 1

- Is the EMS program effective in achieving environmental policy commitments?
 - Compliance?
 - Pollution prevention?
 - Community outreach?
 - Clean-up?
 - Continual improvement?

Response to Management Question 1

- Is the EMS program effective in achieving environmental policy commitments?
 - Compliance?
 - Pollution prevention?
 - Community outreach?
 - Clean-up?
 - Continual improvement?

- Issues (Compliance and clean-up)
 - BNL ratchets down tritium release levels
 - g-2 plume actions need to be agreed upon

Management Question 2

- Is the EMS program effective in achieving the objectives and performance measures?

Response to Management Question 2

- Is the EMS program effective in achieving the objectives and performance measures?
- Issue
 - Move from contract objectives toward vetted ESD's "environmental priorities"

Management Question 3

- Is the EMS program adequate in terms of:
 - Identifying significant environmental aspects and impacts?
 - Resource allocation?
 - Information systems?
 - Organizational issues
 - staff expertise?
 - procedural requirements?

Response to Management Question 3

- Is the EMS program adequate in terms of:
 - Identifying significant environmental aspects and impacts?
 - Resource allocation?
 - Information systems?
 - Organizational issues
 - staff expertise?
 - procedural requirements?

- Issue (Resource allocation and information systems)
 - Legacy clean-up not funded
 - PCB capacitor replacement not funded
 - Fire protection upgrades not funded
 - Consensus building process at BNL is inconsistent

Management Question 4

- Are the objectives and performance measures for EMS system suitable in terms of:
 - Environmental impacts and current conditions?
 - Concerns of stakeholders?
 - Current and future regulatory requirements?
 - Business interests?
 - Technological capability?
 - Internal organizational or process changes?
 - Should additional internal performance measures be established?

Response to Management Question 4

- Are the objectives and performance measures for EMS system suitable in terms of:
 - Environmental impacts and current conditions?
 - Concerns of stakeholders?
 - Current and future regulatory requirements?
 - Business interests?
 - Technological capability?
 - Internal organizational or process changes?
 - Should additional internal performance measures be established?

- Issue (Business interests)
 - Multiple 90-day areas versus one 90-day area
 - Applying DOE 435.1 to process rather than waste

Management Question 5

- Recommended revisions to:
 - Environmental policy and commitments?
 - Objectives and performance measures?
 - Elements of EMS?

Response to Management Question 5

- Recommended revisions to:
 - Environmental policy and commitments?
 - Objectives and performance measures?
 - Elements of EMS?

- Issue?